Common Stinging Insects of Colorado

Whitney Cranshaw
Colorado State University



Some Biting and Stinging "Bugs"

Biting

- Bed bugs
- Conenose bugs
- Bird mites
- Mosquitoes
- Black flies
- Deer/horse flies
- Other biting flies
- Ticks
- Spiders

Stinging

- Yellowjackets
- Hornets
- Paper wasps
- Some solitary wasps
- Honey bees
- Bumble bees
- Some solitary bees
- Harvester ants
- Scorpions







Insects and other arthropods can bite with mouthparts, usually mouthparts designed to suck fluids







Insects sting with a modified ovipositor. Scorpions sting with a special structure on the tip of the abdomen.




Scorpions




Some of the Colorado Scorpions










Pedipalps (chelae)
for prey capture
Scorpion chelicerae (jaws)


Stinger used for defense







Scorpions found in Colorado are not considered to be medically important



An adorable scorpion picked up south of LaJunta

Medically Important Scorpions

Only about 20-25 species of scorpions are considered to be medically important

- All in family *Buthidae*
- No medically important species in Colorado
- Bark scorpion (“Durango scorpion”) in southern AZ and northern Mexico is dangerous
- Fattailed scorpion of North Africa has caused most human fatalities



Arizona bark scorpion

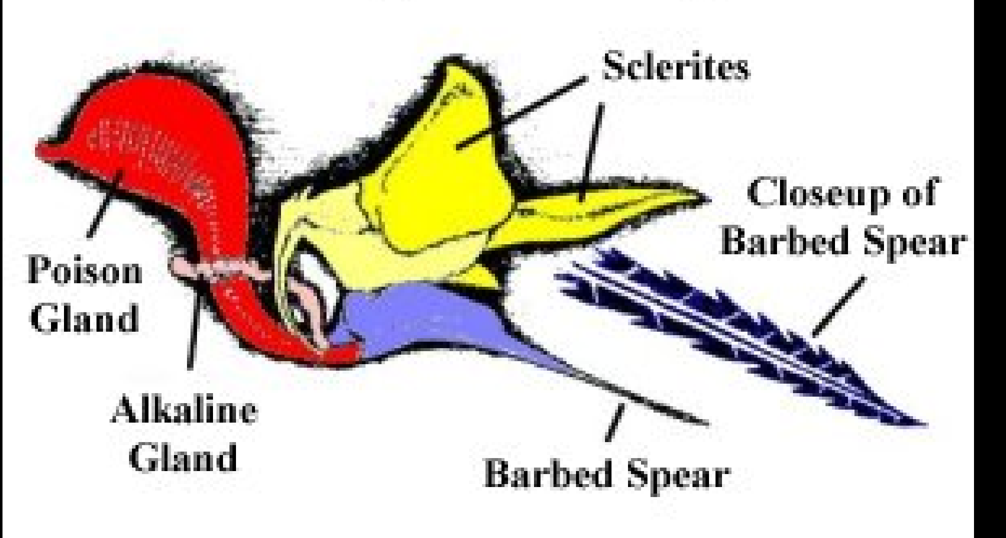


Arizona Bark Scorpion

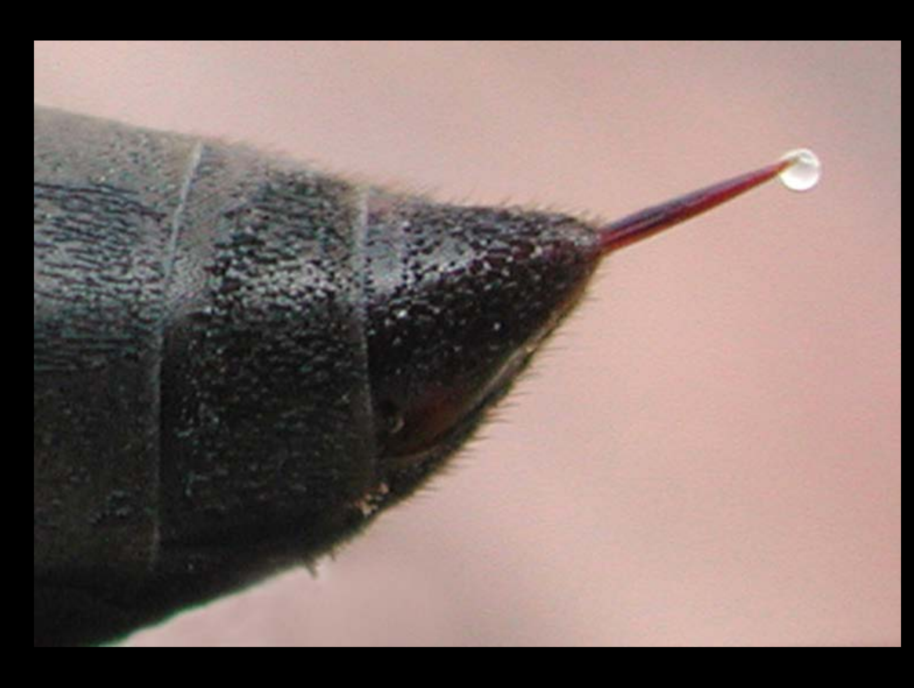


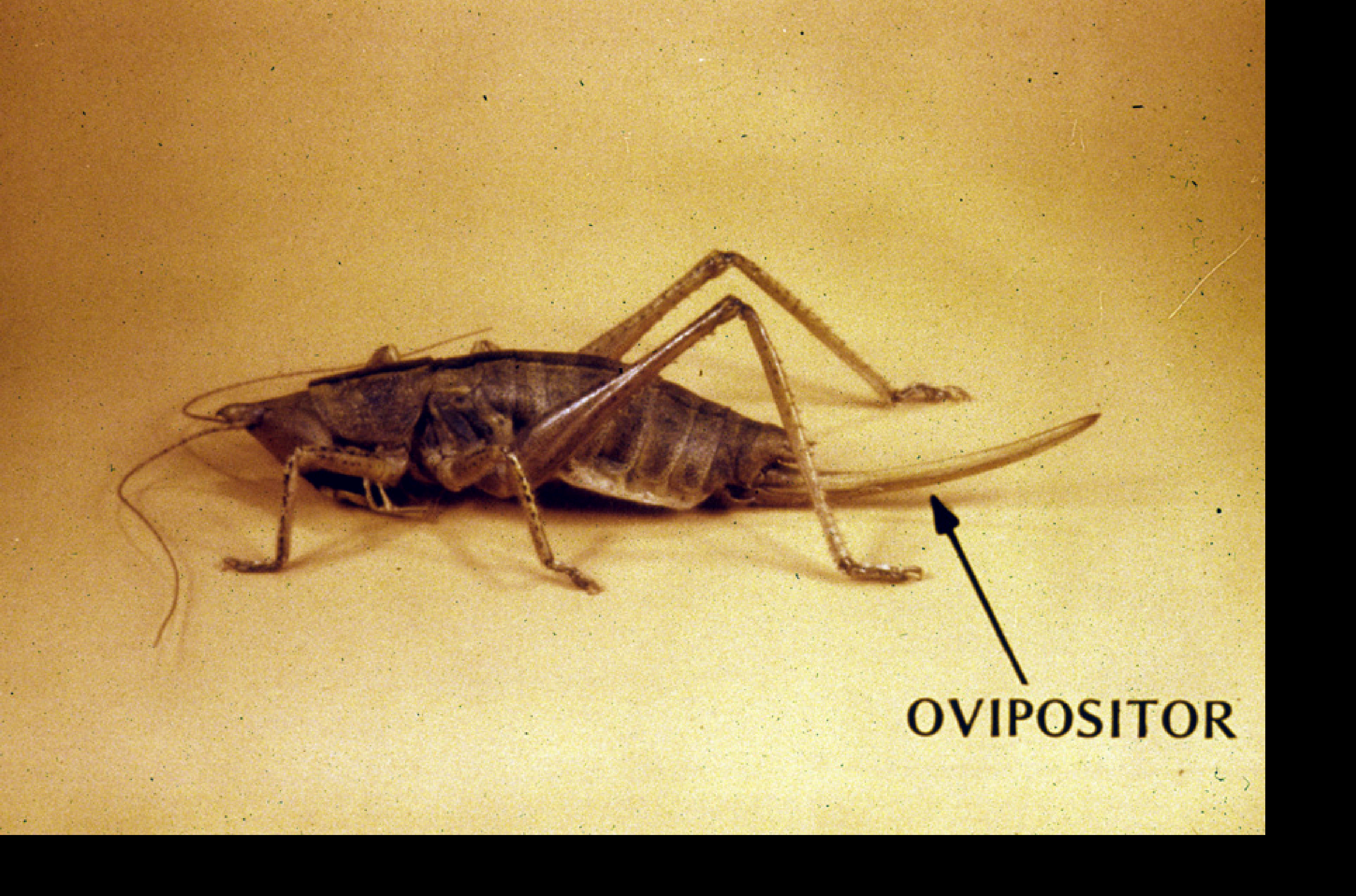
Natural light

Ultraviolet
“black” light



Bees, some wasps, and some ants have a stinger used for defense. The stinger is a modified ovipositor.

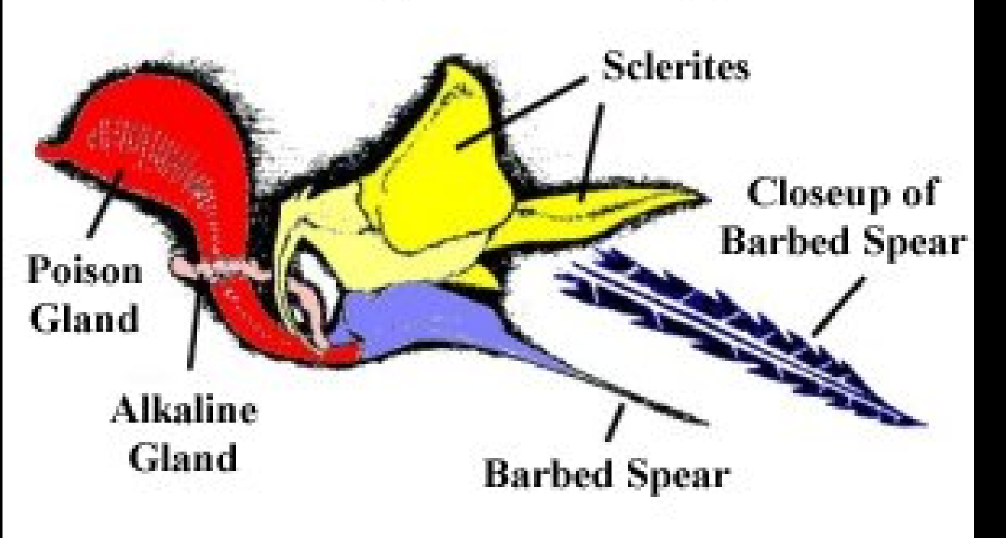




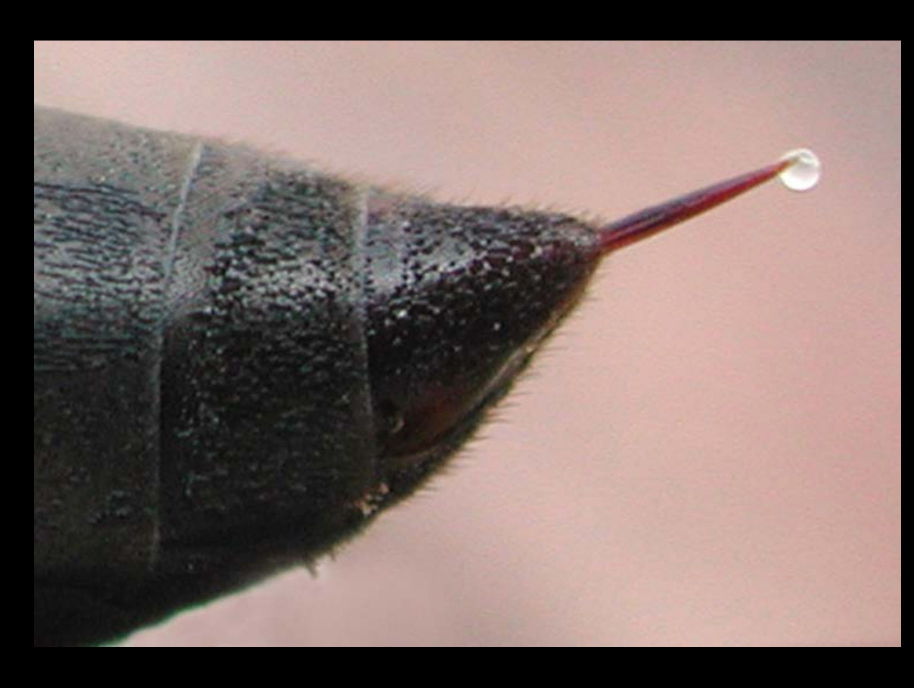
The ovipositor is the structure used by female insects to lay eggs.

Male and female house cricket





Bees, some wasps, and some ants have a stinger used for defense. The stinger is a modified ovipositor.



Schmidt/Starr Sting Pain Index

- Attempt to rank relative pain produced by the sting various bees, wasps, ants
  - all in Order Hymenoptera
- 0 to 4 ranking system
  - 0 No pain
  - 1 Pain so slight as to provide no deterrent
  - 2 Painful
  - 3 Sharply and seriously painful
  - 4 Traumatically painful

Schmidt/Starr Sting Pain Index

- **Attempt to rank relative painfulness of the sting by various bees, wasps, ants (Hymenoptera)**
  - **0 to 4 ranking**
- **Descriptive comments may have sometimes been added**
- **Top ranked sting – Bullet ant (4.0+)**
  - ***"Pure, intense brilliant pain. Like fire walking over flaming charcoal with a 3-inch rusty nail in your heel"***

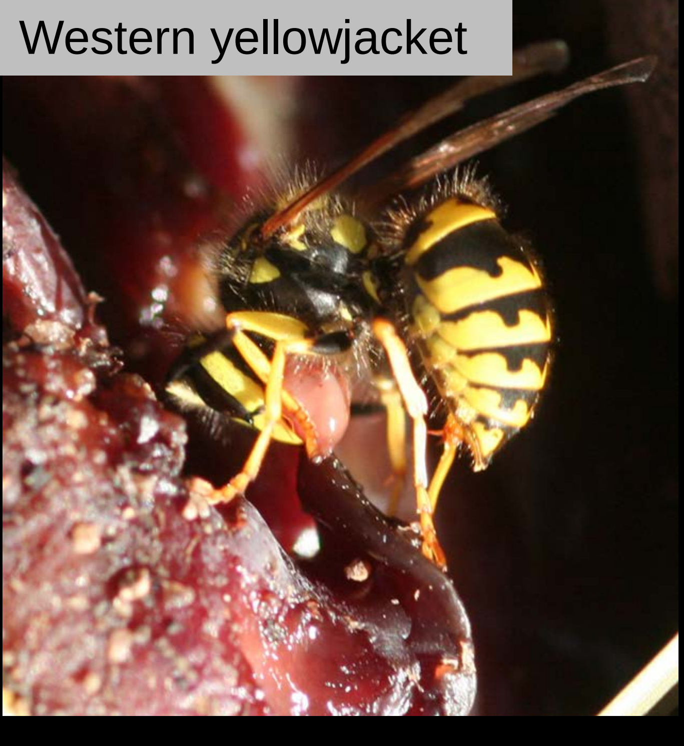
Most painful stinging insect in Colorado?

Tarantula Hawk

4.0 Pain Index

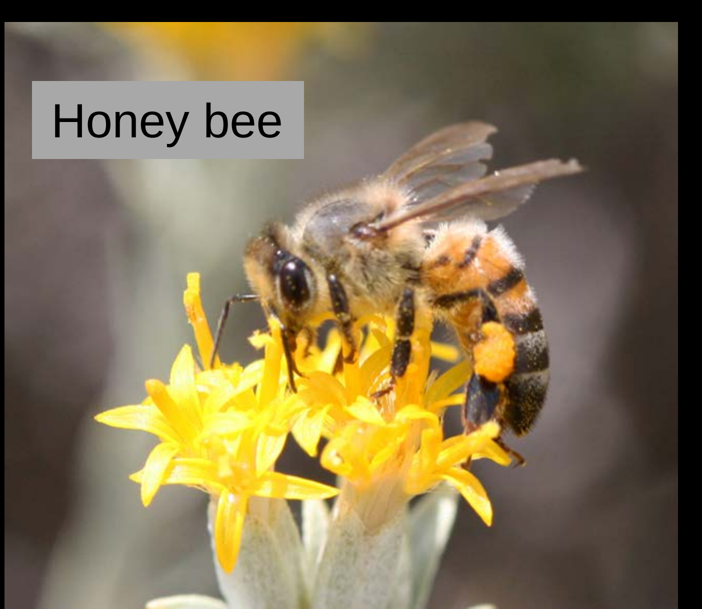
“Blinding, fierce, shockingly electric. A running hair drier has been dropped into your bubble bath.”

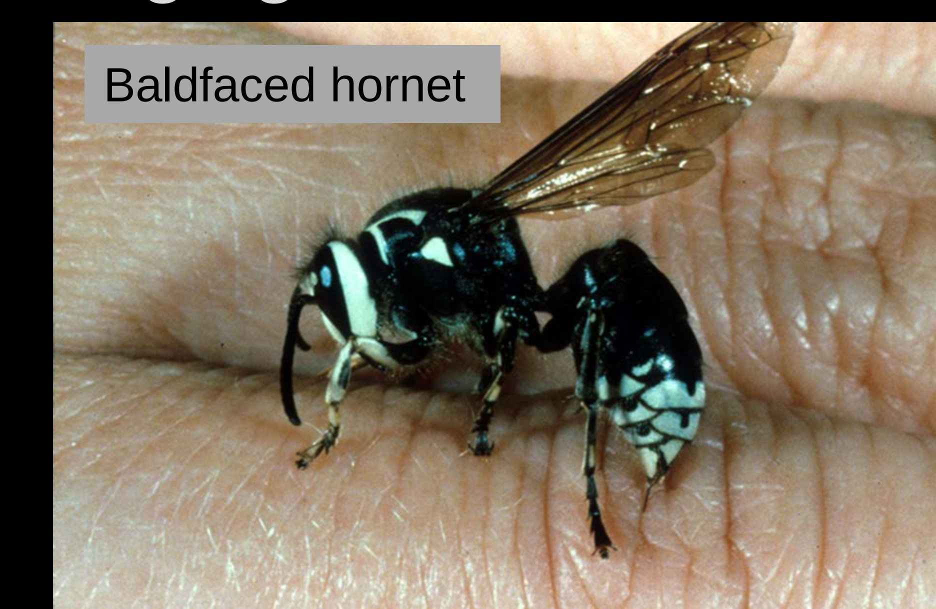






Common Colorado Stinging Insects





Habits of Bees & Wasps

- Bees
  - Social bees
    - Perennial colony (honey bee)
    - Annual colony (bumble bees)
  - Solitary bees (leafcutter bees, digger bees)
- Wasps
  - Social wasps (yellowjackets, hornets, paper wasps)
  - Solitary wasps (hunting wasps, parasitic wasps)

Common Social Bees

Social Bees

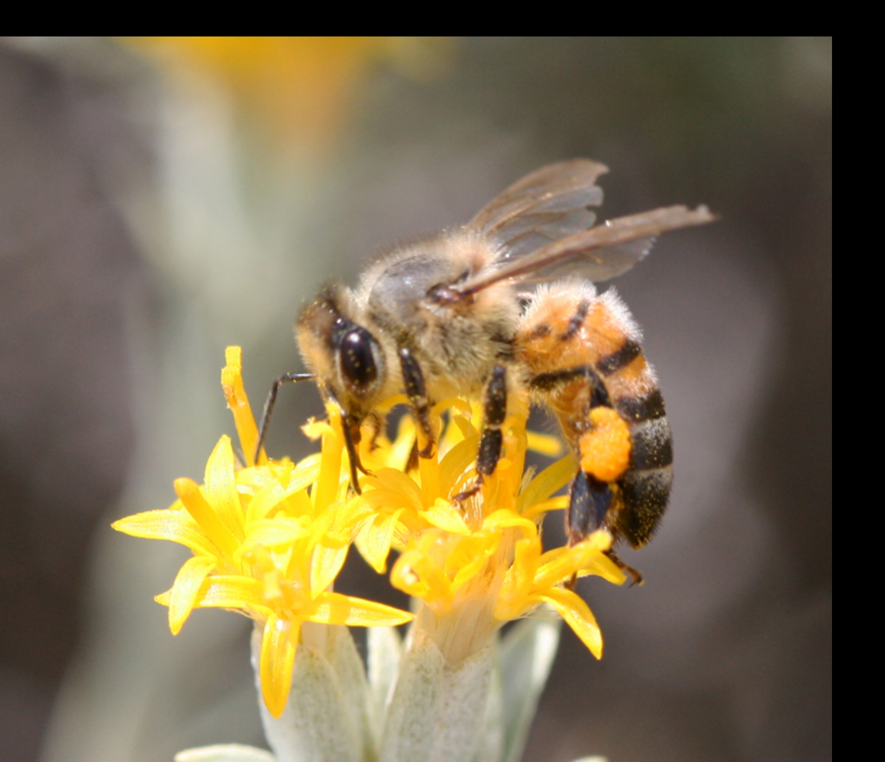
- Honey Bees
  Apis mellifera
  (Perennial Colony)
- Bumble Bees
  Bombus spp.
  (Annual Colony)



Honey Bee

Apis mellifera





Honey bee

Nest constructed of wax




HONEY BEE-WAX SCALES
1977 NAMCO ©
Wax flakes are produced by special glands of the thorax, then are molded into comb
1977 NAMCO ©
Van Waters & Rogers
HONEY BEE-HONEY COMB







Developmental Stages of Honey Bees

Honey bees with comb that is being used to for rearing



Honey bee colonies have specialized castes that include a **queen** (fertile female), **drones** (males) and numerous **workers** (infertile females)




Honey bees produce
a perennial nest
Wild Bee Hive
in sycamore tree

Honey Bee Colonies Produce Swarms

This may be thought of as a type of budding as a means for the colony – a superorganism – to reproduce.



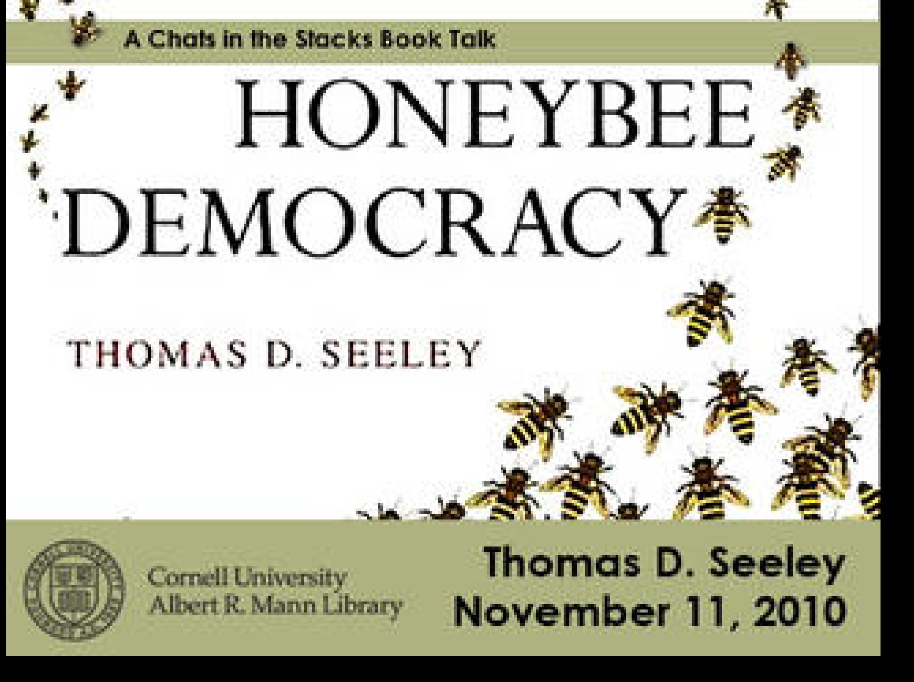



Tree cavities are the normal nest site used by honey bees

Ideal Site for Wild Honey Bee Hive

-Located well above ground
-Capacity of 15L to 75L
-Small entrance, located at bottom of cavity




A Chats in the Stacks Book Talk
HONEYBEE
DEMOCRACY
THOMAS D. SEELEY
Cornell University
Albert R. Mann Library
Thomas D. Seeley
November 11, 2010





Failure to find a suitable nest site results in a doomed colony that will not successfully survive winter





Wall voids of buildings can provide ideal sites for honey bees to locate a hive



Honey bees that establish a colony behind wall create a major – and $$$$ - control issue



The stinger of a worker honey bee is barbed

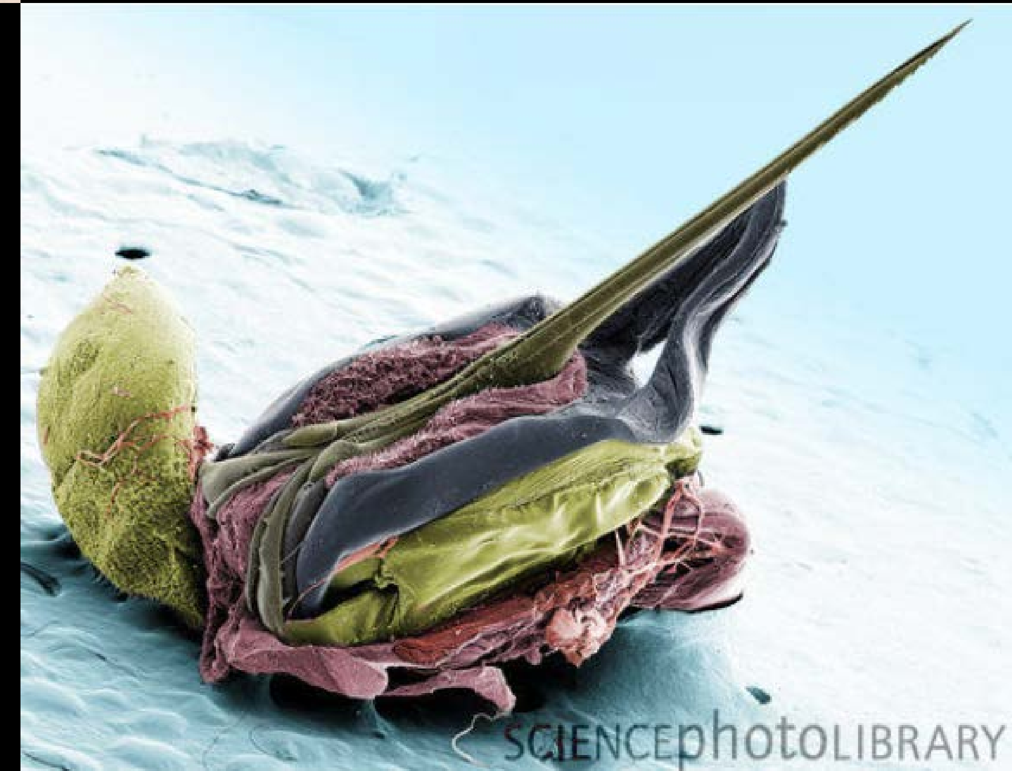






Honey bee stinger and poison sac detach and remain embedded in skin

The only insect that regularly leaves a stinger in the skin is a worker honey bee



Honey Bee Sting on Human Skin

University of Florida - Entomology and Nematology



-Squeamish alert: Shows close up of a sting on a human arm.

-Note the stinger still pulsating after the honey bee has been removed

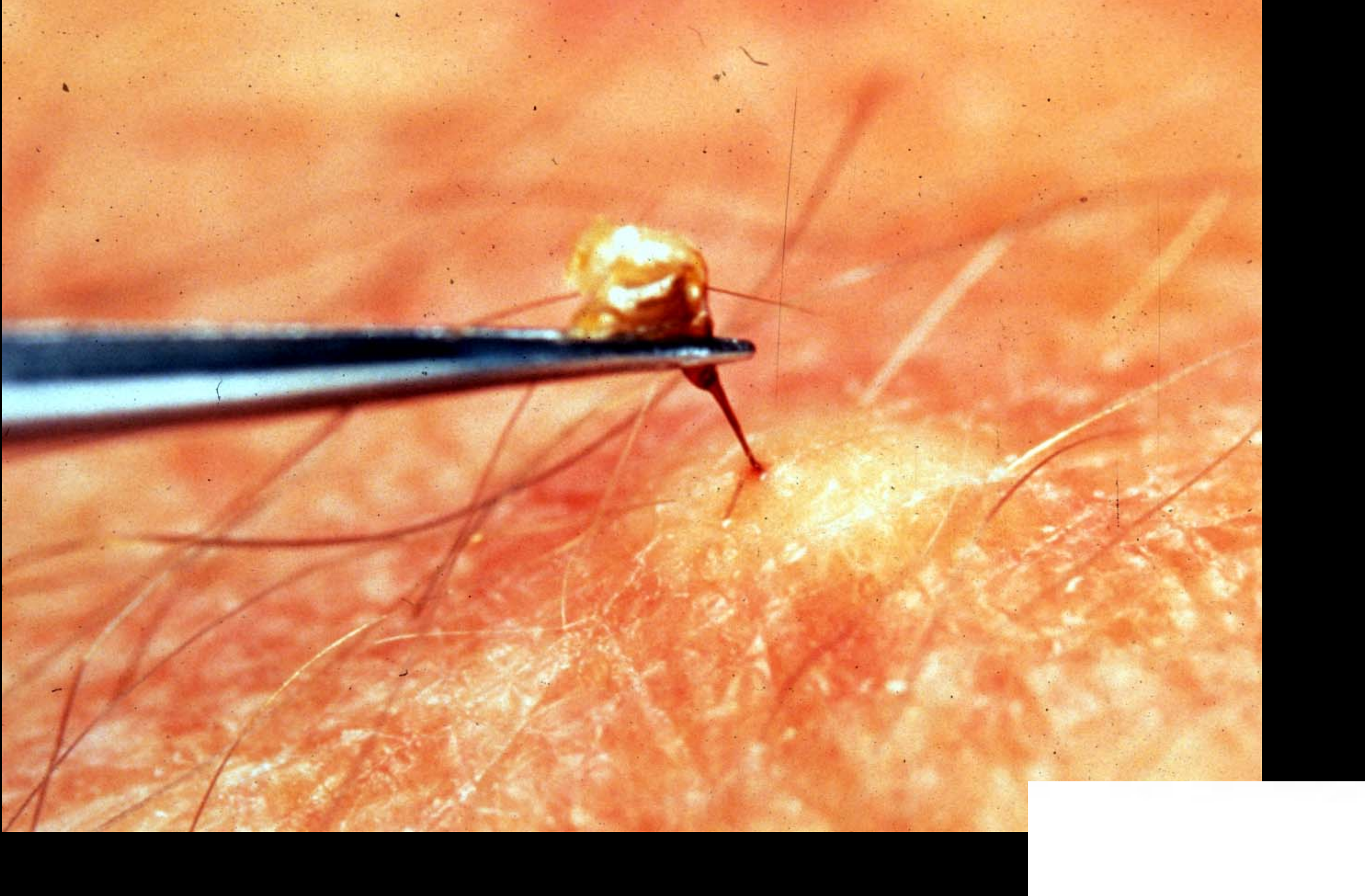

Honey bee stinger and
poison sac detach and
remain embedded in skin

Sting Pain Index

Honey Bee (2.x)



"Like a match head that flips off and burns your skin"



Removing a honey bee stinger



Bumble Bees

Bombus species




Bumble Bee
Van Waters & Rogers
1985 division of Univar






Bumble Bees

FROM:



Bumble Bee Life History

Bumble bees create annual colonies – new colonies are established every year by a foundress queen









Some bumble bee nests

Providing nesting sites for bumble bees?











Bumble Bee Stages

Top Left: Capped Pupae

Above: Pupa

Left: Larva

Bumble Bee Queens and Workers





Bumble bees create wholly new colonies each season (annual nests)

Bombus huntii – Overwintered queen on left





Bumble Bees Are “Buzz Pollinators”

Some plants are dependent on buzz pollination





Some plants (e.g. tomato and other nightshade family plants) are dependent on buzz pollination





A commercially available bumble bee nest



Stinging Ants of Colorado





Harvester ants
Pogonomyrmex spp.



Southern fire ant
Solenopsis invicta

Some ant (females) have a functional stinger and (most) can inject some type of venom

Ants do not have a barbed stinger

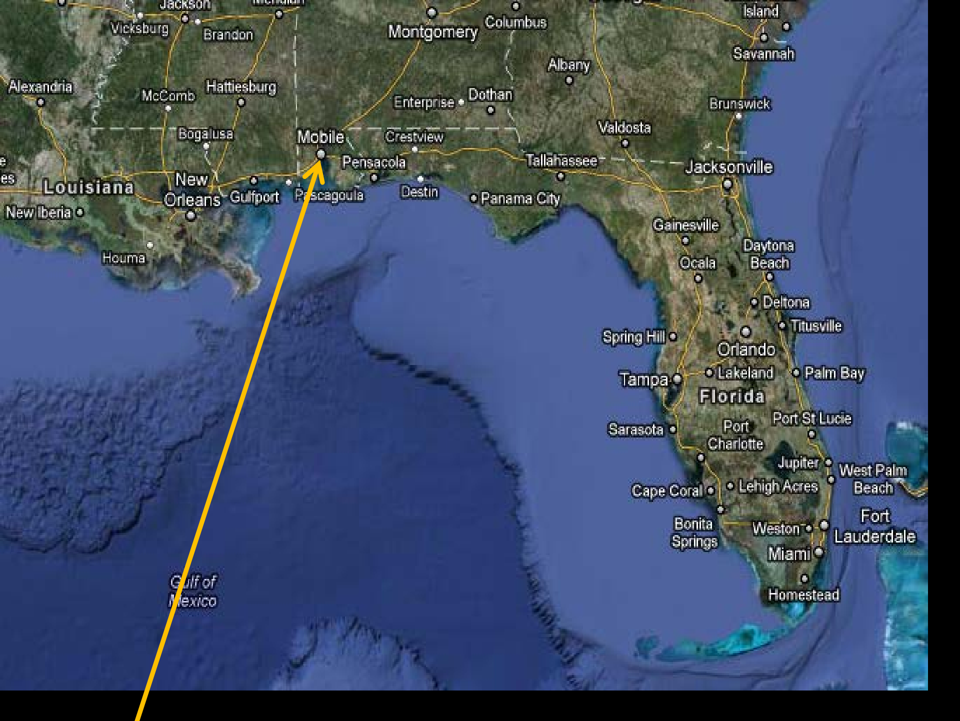




Ants in the subfamily Formicinae do not sting

Some will use formic acid or other chemicals in defense

From the Ammonite production Smalltalk Diaries



Red Imported Fire Ant (*Solenopsis invicta*), or simply RIFA

Page 144

Imported Fire Ants

Entered the United States through the port of Mobile (in Alabama) in the 1930's

This insect is native to South America



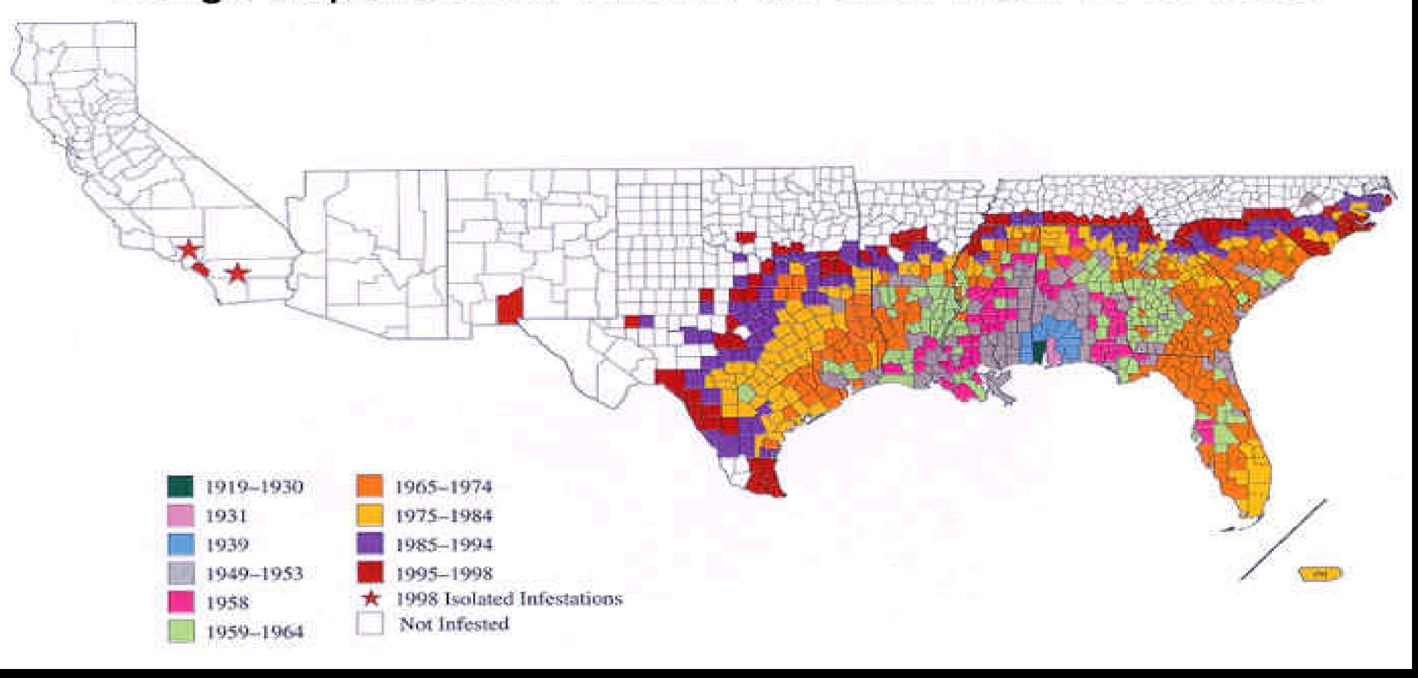
Puss-filled blister

- A common reaction to sting by the red imported fire ant



UGA0001006

Range Expansion of RIFA in the U.S. From 1918-1998



Potential
Red Imported Fire Ant
Range Expansion

RIFA Survival

Improbable

Undetermined

Possible

Certain

Annual Rainfall

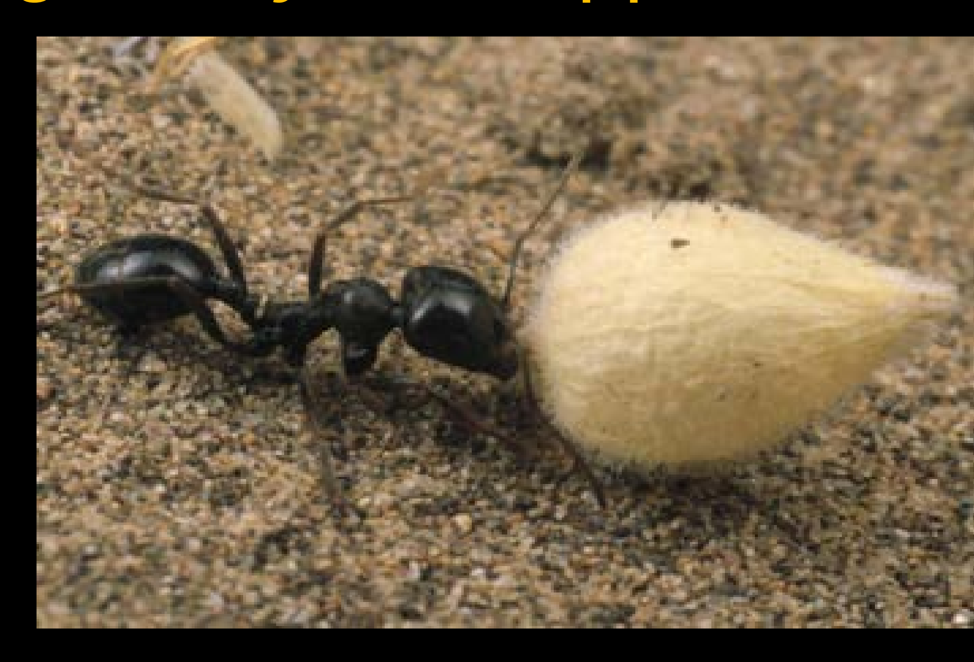
<Not enough

>Enough

USDA Quarantine
(May 2000)

Harvester ants – *Pogonomyrmex* spp.





Harvester ants are seed feeders



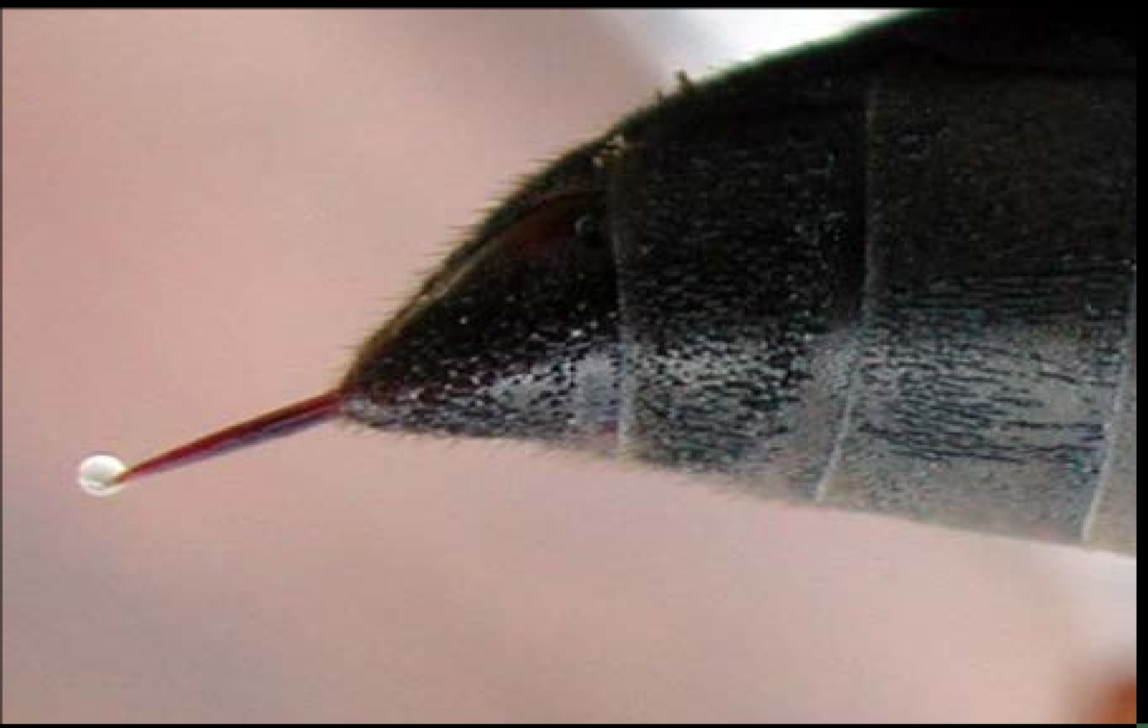
Harvester ants – *Pogonomyrmex* spp.

Plaster cast of a large P. badius harvester ant nest



Distinct nest made of tiny pieces of gravel with a southeast entrance





Harvester ants possess a blunt stinger and can produce one of the most painful stings of any ant species







Uncle Milton's Ant Farm

Harvester ants are the "ant of commerce" commonly sold to inhabit ant farms



Common Social Wasps

Social Wasps
(***Note:*** All are Annual Colony Producers)

- **Yellowjackets** (*Vespula* spp.)
- **Hornets** (*Dolichovespula* spp.)
- **Paper Wasps** (*Polistes* spp., primarily)





Yellowjackets

Vespula **species**



Western Yellowjacket (*Vespula pensylvanica*) – Key nuisance wasp of Colorado



The western yellowjacket feeds its young animal matter – usually carrion or dead insects





Western yellowjacket scavenging on meat (left), dead earthworm (below, left) and splattered insects on automobile






They will commonly feed on meaty materials in outdoor dining areas



…and also take sweets







Yellowjackets almost always nest below ground

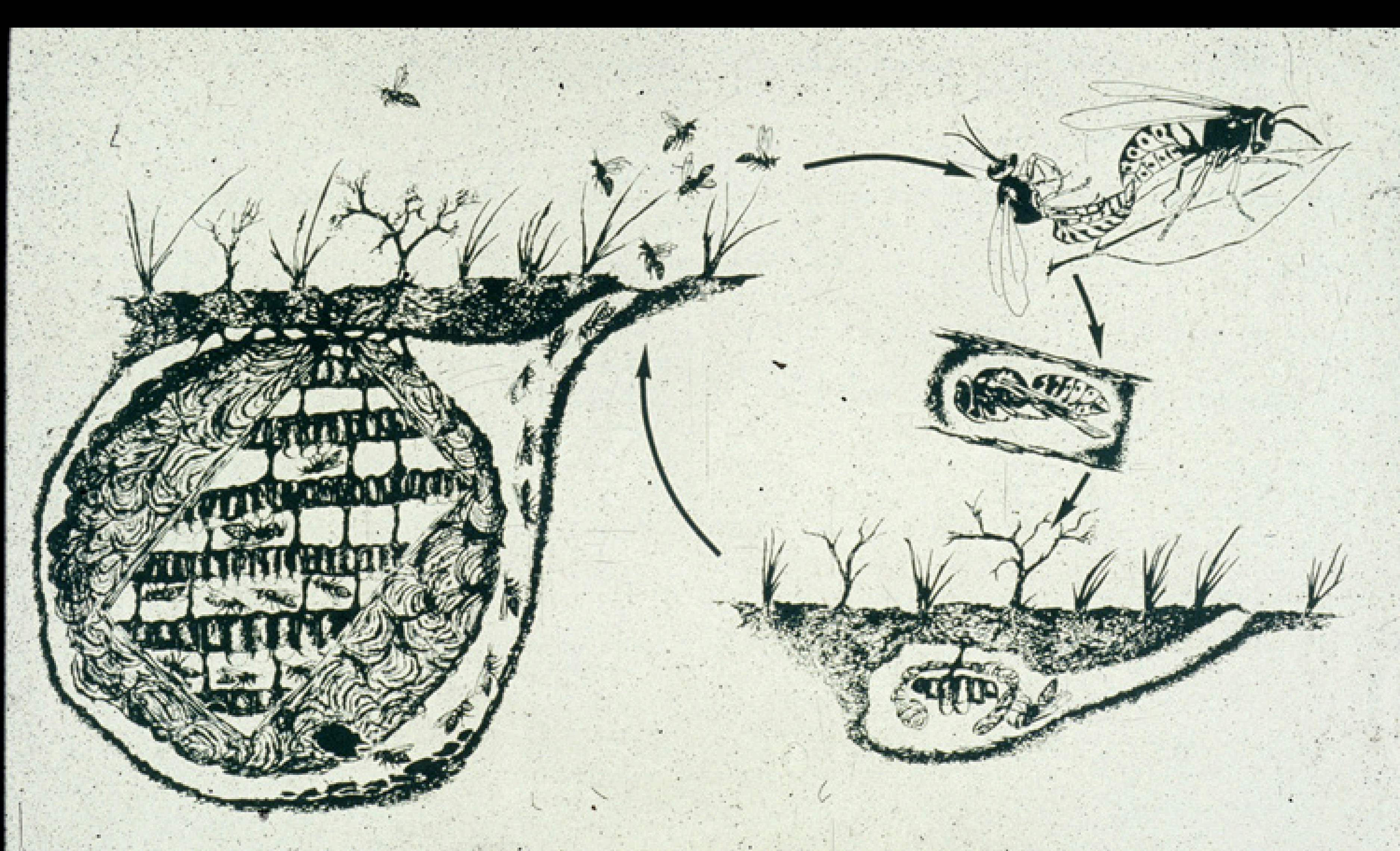


FIGURE 29 — Yellowjacket life cycle (*Vespula pensylvanica*): *a*, Mating; *b*, fertilized queen in diapause during winter months; *c*, queen nest beneath soil surface; *d*, nest at peak of colony development (J. Krispyn).


G156-17


Yellowjacket adult wasp
tending larvae
Van Waters & Rogers Inc.
1987
subsidiary of Univar

Western yellowjacket nest exposed by skunk/raccoon digging




FEET
INCH
1
TRU-ZERO HOOK
2
3
STANLEY
4
Life Guard
5
6
MADE IN U.S.A.
7
8





Western yellowjacket nest at base of wall and spruce tree in my yard

Note mud at entrance from excavations during colony expansion

Yellowjackets almost always nest below ground

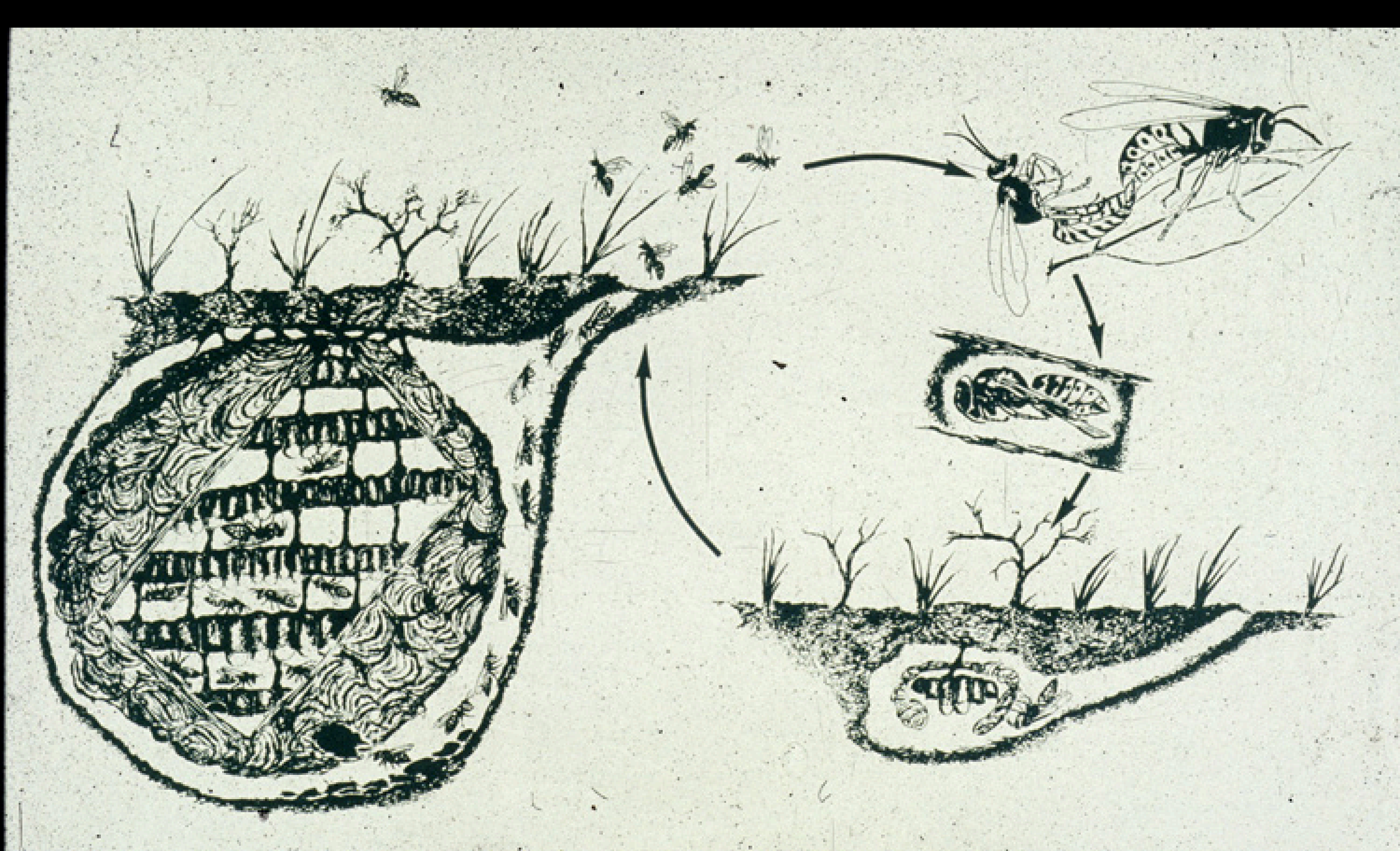


FIGURE 29 — Yellowjacket life cycle (*Vespula pensylvanica*): *a*, Mating; *b*, fertilized queen in diapause during winter months; *c*, queen nest beneath soil surface; *d*, nest at peak of colony development (J. Krispyn).

Wasp stingers *are not* barbed





Most “Bee Stings” Are Not Produced By Bees!!!!

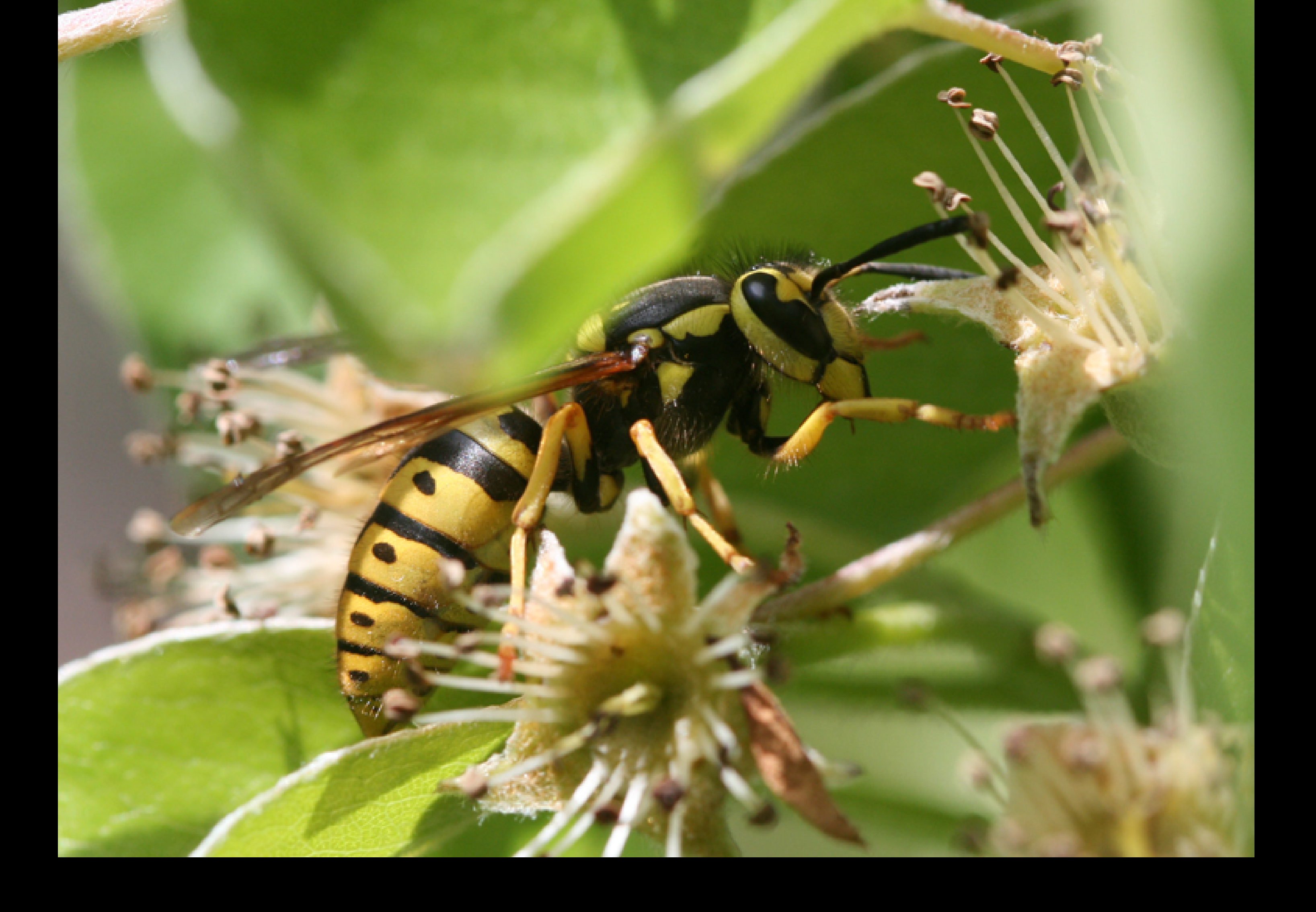
Yellowjackets are involved in 90%+ of all “bee stings”



Schmidt Sting Pain Index

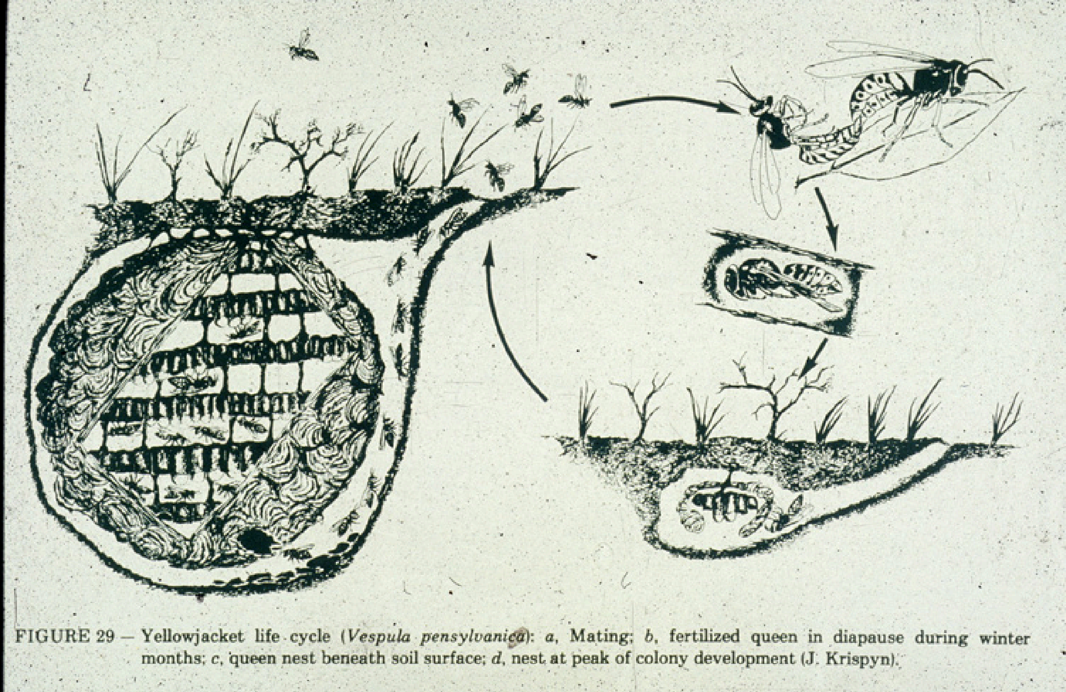
Yellowjacket (2.0)

“Hot & smoky, almost irreverent. Imagine W.C. Fields extinguishing a cigar on your tongue.”



Yellowjackets as pollinators?

***Marginal*, at best.**



Nests are **annual**, constructed anew each year



The only stage surviving between seasons are **fertilized queens**, produced in late summer and early fall.



Ultimate colony size can be many hundreds by the end of summer.

Western yellowjacket nest exposed by skunk/raccoon digging



Only a few females, fertilized potential future queens will survive between seasons.



Many traps are sold to capture yellowjacket wasps





2015 Yellowjacket Trapping Trials

Traps that caught the most western yellowjackets in 2015 trials

Rescue! OnamenTrap (Liquid trap)





SpringStar (Oak Stump) Liquid Trap

AlphaScent Lure with Yellow Card



Traps that are ***very poor*** in capturing yellowjackets





FIGURE 29 — Yellowjacket life cycle (*Vespula pensylvanica*): *a*, Mating; *b*, fertilized queen in diapause during winter months; *c*, queen nest beneath soil surface; *d*, nest at peak of colony development (J. Krispyn).

Most effective use of yellowjacket traps?

Probably early in the year targeting overwintered queens





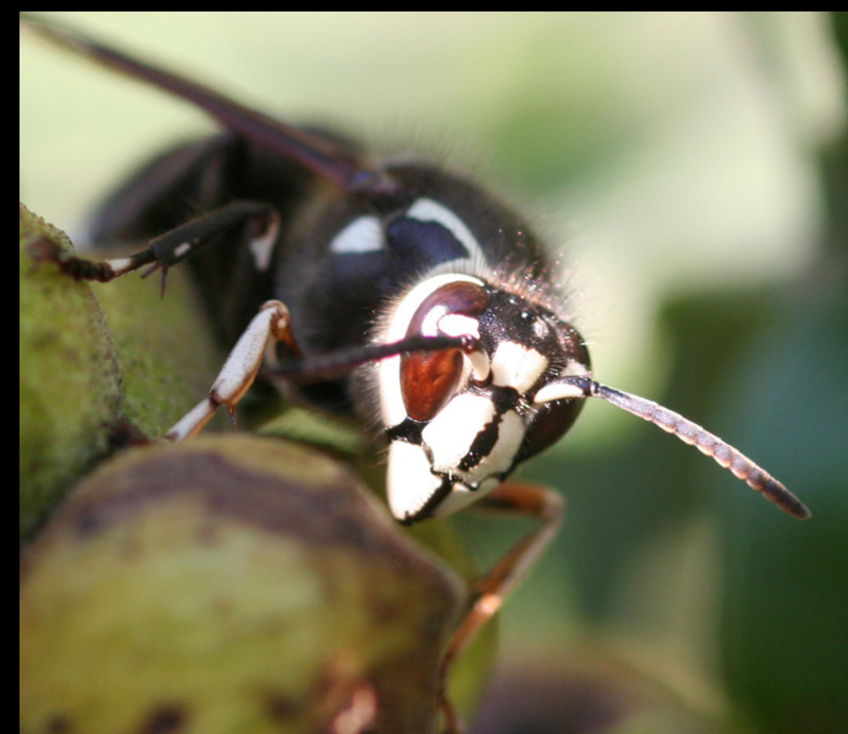




Hornets

Dolichovespula species





Baldfaced Hornet

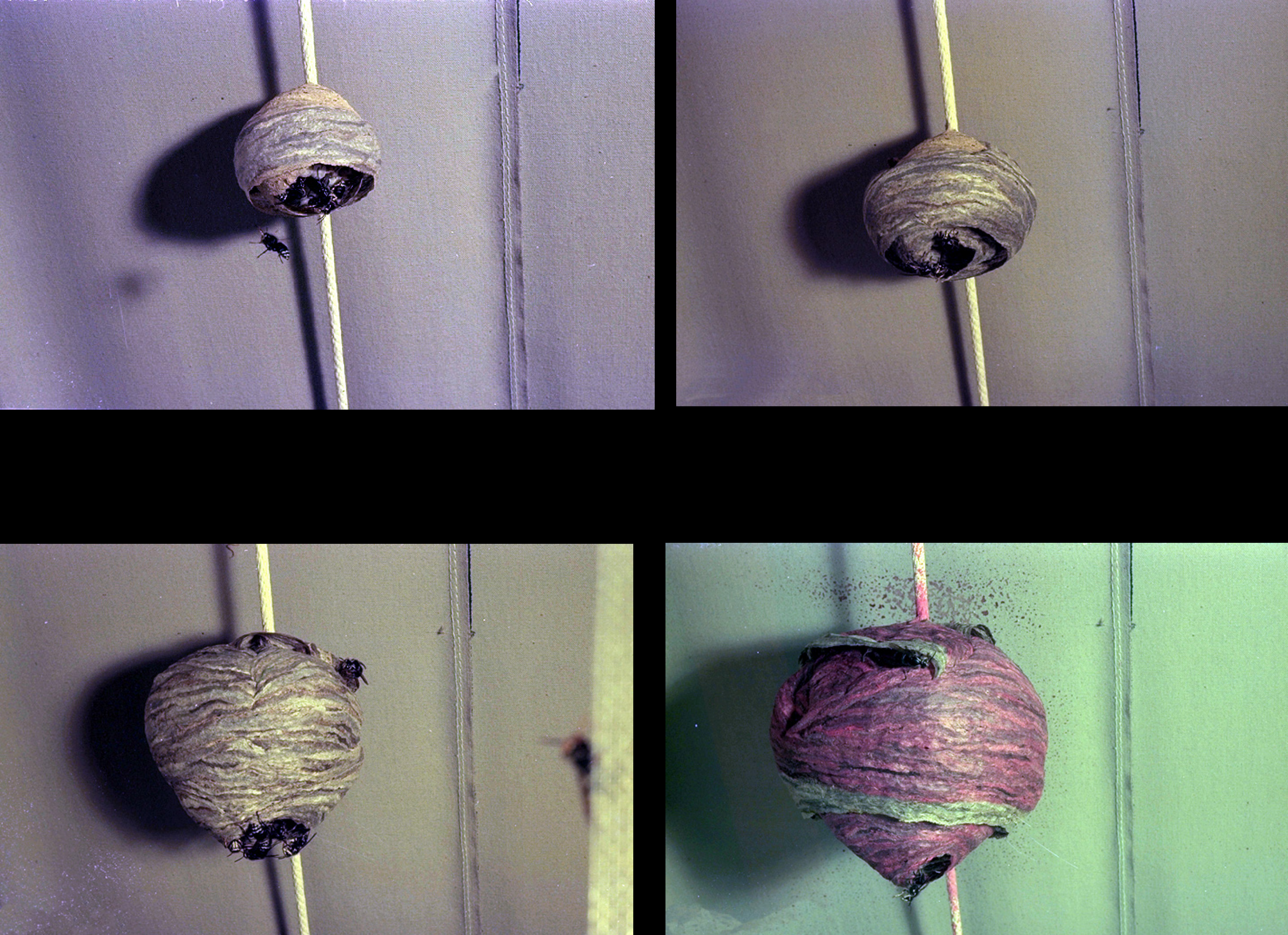
Dolichovespula maculata


Baldfaced Hornet
Nests in Trees
and Shrubs



Baldfaced hornet chewing on weathered wood

Surface of a baldfaced hornet nest









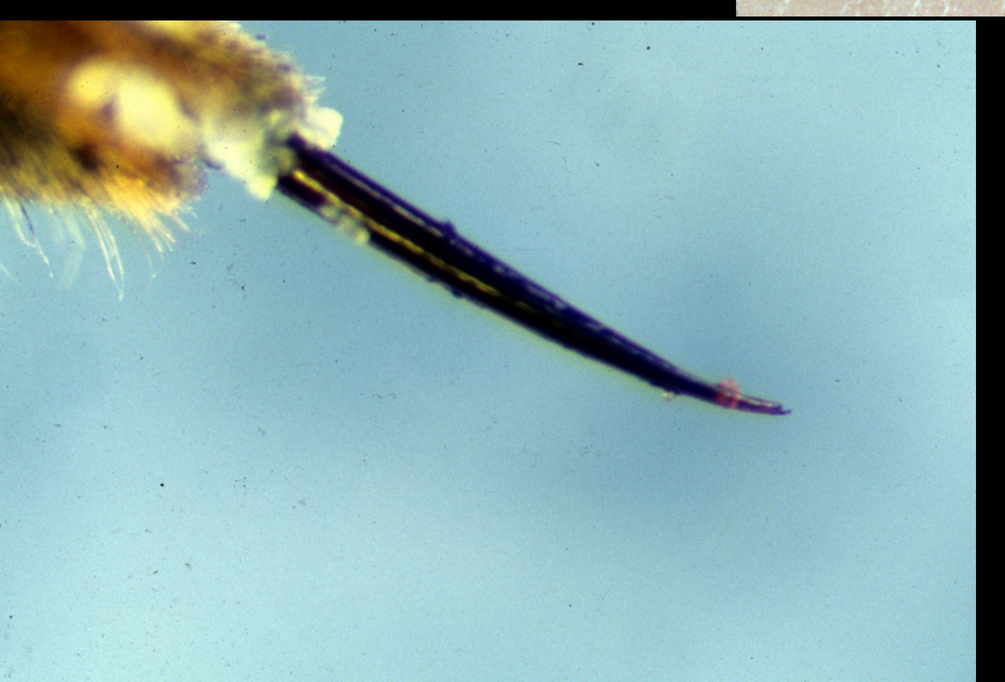
Aerial Yellowjacket, *Dolichovespula arenaria*



Aerial Yellowjacket nests under eaves and on sides of buildings







The Stinger of Hornets is Not Barbed

Schmidt Sting Pain Index

Baldfaced Hornet (2.0)

“Rich, hearty, slightly crunchy. Similar to having your hand mushed in a revolving door.”





Paper Wasps

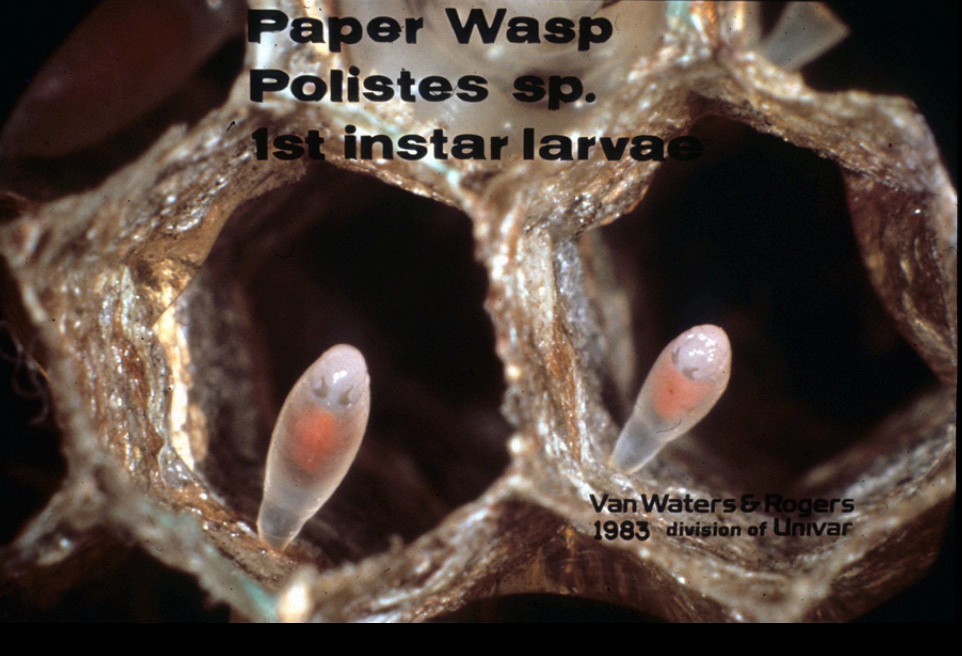
Polistes species, primarily

Paper wasp gnawing on weathered board for wood fibers





Photograph courtesy of Joseph Berger

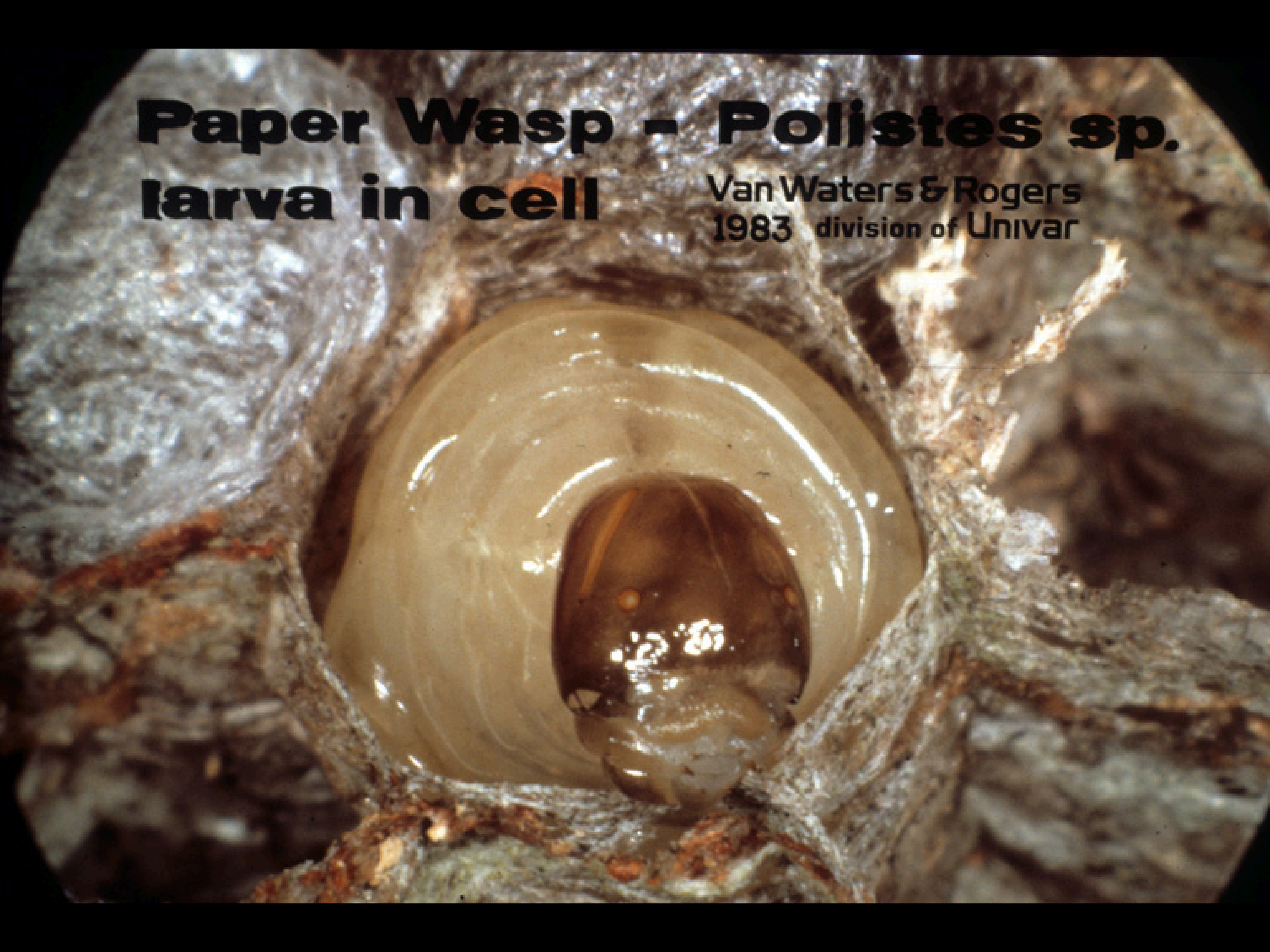

Paper Wasp
Polistes sp.
1st instar larvae
Van Waters & Rogers
1983 division of Univar










Paper Wasp - Polistes sp.
larva in cell
Van Waters & Rogers
1983 division of Univar

Paper wasps native to Colorado

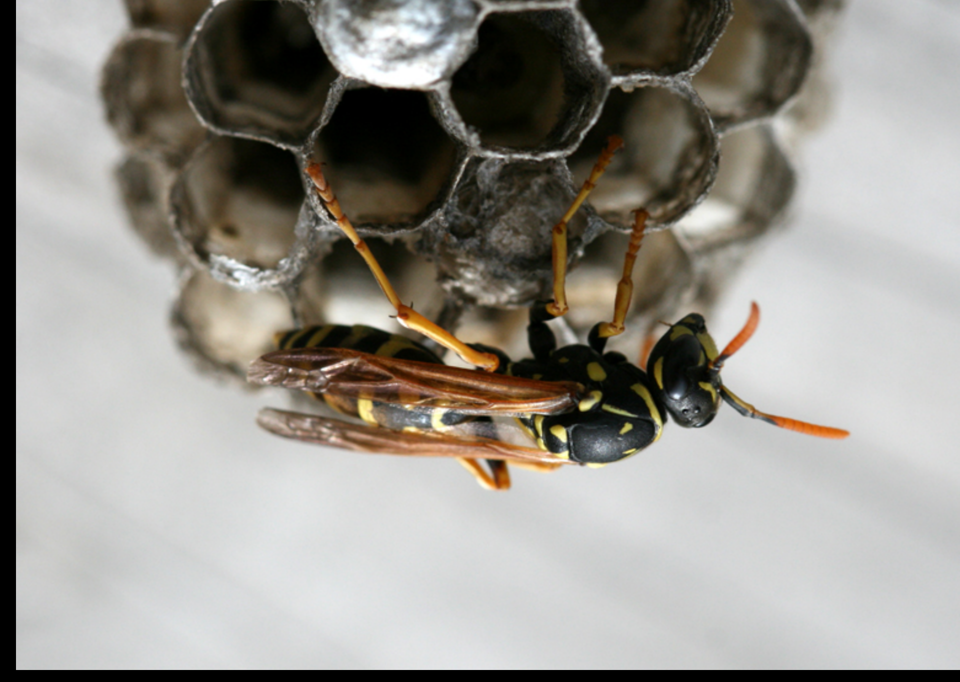












European Paper Wasp

A new species in Colorado (post 2001)



European Paper Wasp Nesting in Metal Building Support


PLASTICS CO
PA.





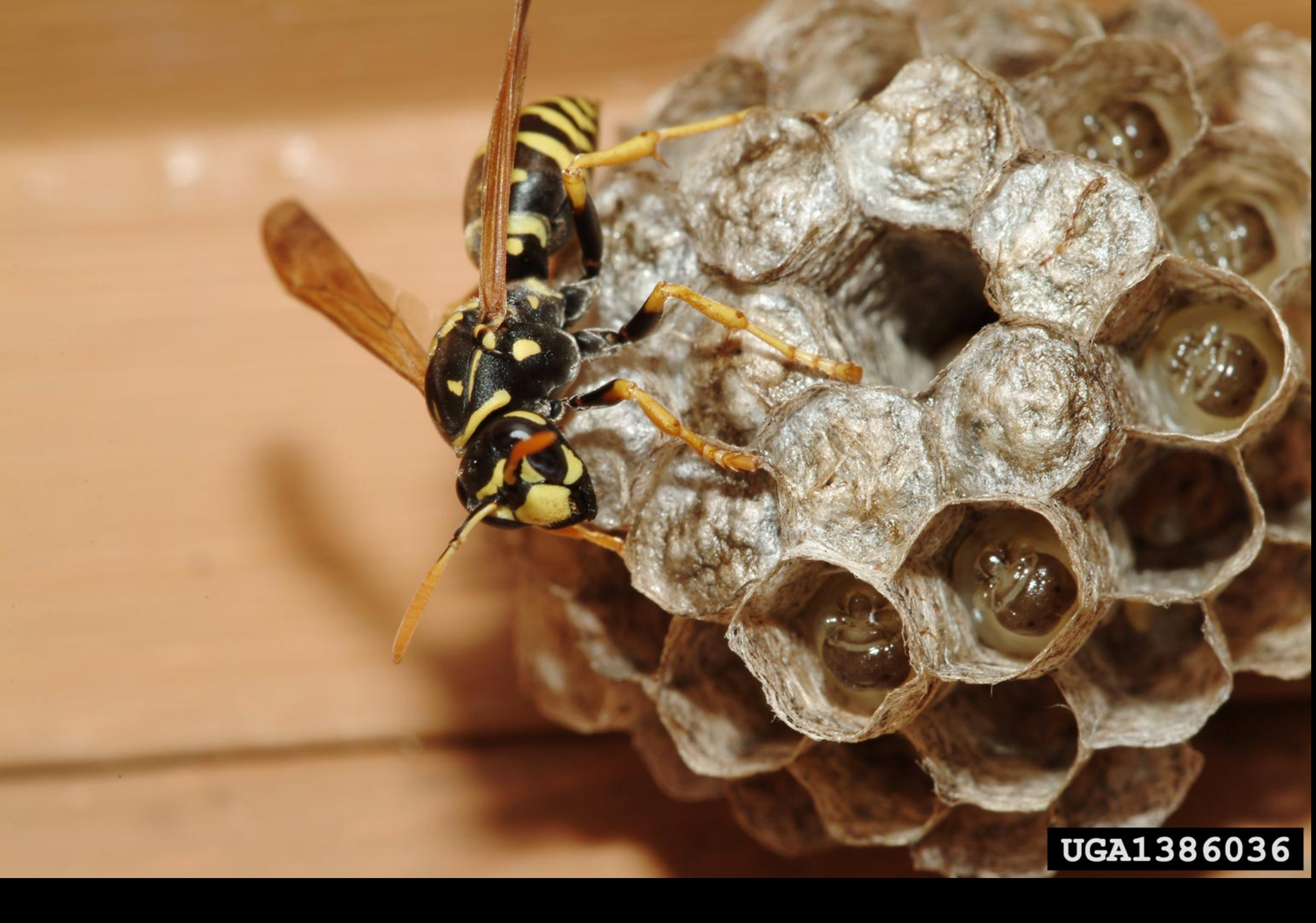
European paper wasps in our clothes line





European paper wasp nest established on growing sweet corn!





Photograph courtesy of Joseph Berger/BugWood.org

Large Nest of European Paper Wasp



Schmidt Sting Pain Index

Paper Wasp (3.0)

"Caustic and burning. Distinctly bitter aftertaste. Like spilling a beaker of hydrochloric acid on a paper cut."

Some Impacts of the European paper wasp on the Rocky Mountain West

- Added a significant new stinging pest to region
  - Highly visible
- Impacts on yard/garden Lepidoptera
- Impacts on some fruit production
- Stimulates stupid purchases





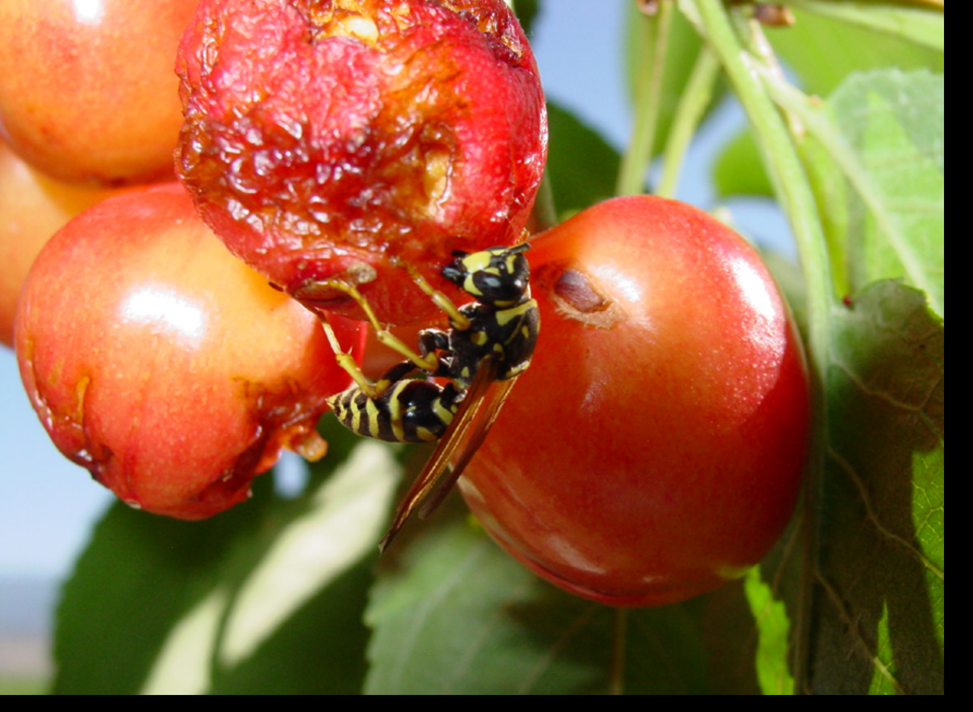
Nests are ubiquitous and very frequently observed. Stings are common, although not as common as by western yellowjacket.



Impacts on yard/garden Lepidoptera

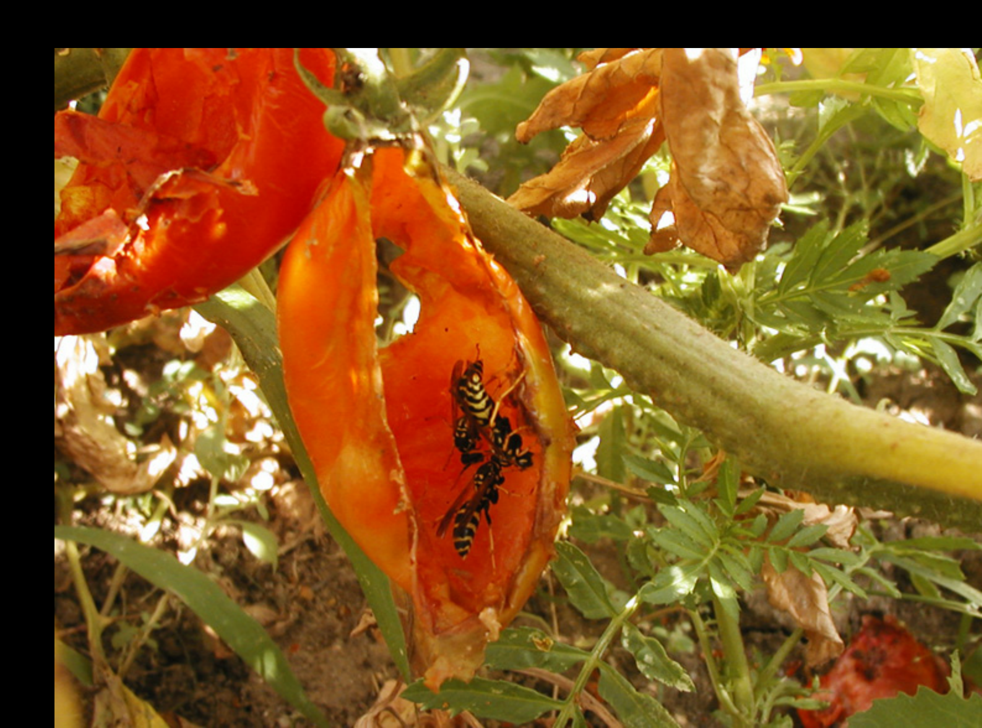








European paper wasps acting badly – fruit injuries!





European Paper Wasp



Western Yellowjacket



Note trailing legs of European paper wasp



European Paper Wasp vs.Western Yellowjacket

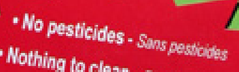
- Predator of insects, primarily
- Produces open nests above ground
- Less likely to sting than most social wasps/bees
- Not attracted to wasp traps

- Scavenger. Commonly visits food and garbage.
- Produces below-ground or hidden nest
- Readily stings when nest disturbed
- Attracted to wasp traps



Traps do not capture the European paper wasp or any other paper wasps


Watch those pesky wasps disappear with the Original Waspinator!*
Regardez les vilaines guêpes disparaître sous l'effet du véritable Waspinator !*


EXCLUSIVELY FROM DEWITT
The Original
Le véritable
Waspinator
• No pesticides - Sans pesticides
• Nothing to clean - Rien à nettoyer
• No mess - Non salissant
Easy to use and comes with everything you need. Enjoy WASP FREE* family picnics, dinners on the deck, or parties on the beach. Eat your corn on the cob in peace with the Waspinator!
Facile à utiliser, vendu avec tout le nécessaire. Passez d'agréables pique-niques familiaux, soupers sur la terrasse ou fêtes sur la plage, SANS GUÊPES*. Savourez votre épi de maïs en paix grâce au Waspinator!
1 unit/1 unité
Patent Pending
Brevet en instance
Keeps Wasps Yellow Jackets and Hornets Away!!!


The Original
Waspinator
Keeps Wasps Yellow Jackets and Hornets Away!!!





Trap next to Waspinator



Paired trap out-of-sight of Waspinator



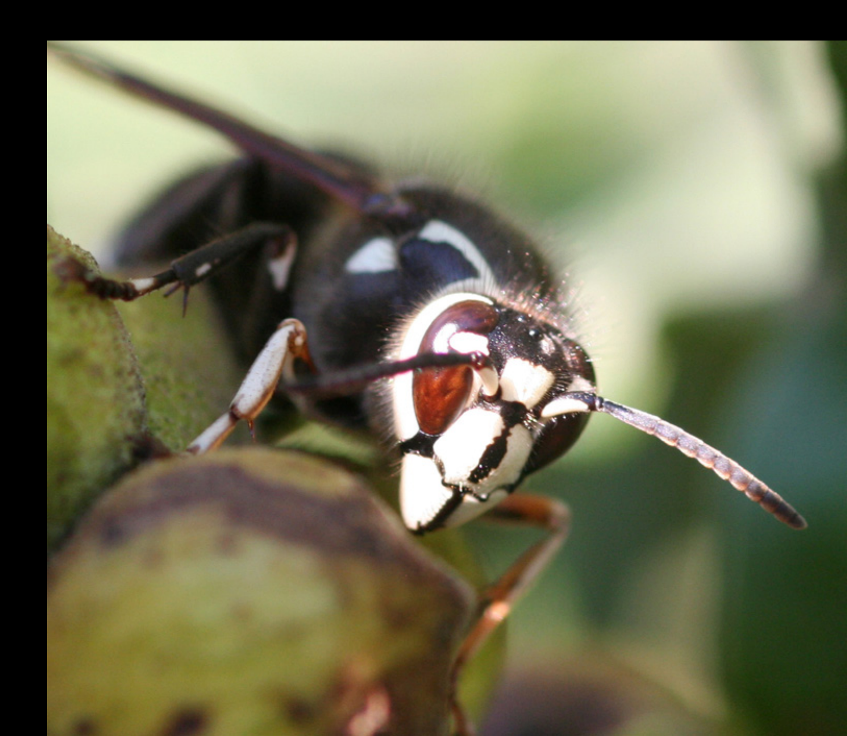
9.6 Western yellowjackets/day



10.6 Western yellowjackets/day

Results – No significant differences in capture of western yellowjackets related to Waspinator proximity





Waspinator – Attempt to mimic nest of the Baldfaced Hornet????





If it sounds too good to be true – it is!